



**POTLATCH
TUSSOCK MOTH
CONTROL PROJECT**

FOREWORD

This report was written to make of record the major points of interest and fact which were considered to be of value in organizing future aerial insect control projects.

The statistical information contained in the report was obtained from the project records of the Idaho State Forestry Department and the United States Forest Service. Mr. Clyde Miller of the St. Joe National Forest and Mr. David E. Ketchum, Division of State and Private Forestry, Region One, were helpful in tabulating data from Forest Service records and in reviewing the Report. Other personnel from both the State and the Forest Service provided advice and information helpful in preparation of this report, and although not mentioned individually, their help is appreciated and recognized.



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WAS:jac

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REPORT OF OPERATIONS
POTLATCH TUSOCK MOTH CONTROL PROJECT
1965

INTRODUCTION:

The successful completion of the Potlatch Tussock Moth Control Project in Latah and Benewah Counties marked another step in the seemingly endless task of controlling forest pests. More important, perhaps, was the milestone marked in establishing a new high in private, State and Federal cooperation in the control of forest pests.

The evaluation of the infestation and a plan of control was prepared by the United States Forest Service and submitted to a committee composed of Forest Service personnel, representatives of the State Forester and private landowners. The decision to embark on a control project was truly a cooperative effort based on the consensus of the landowner committee. Upon approval by the Federal Committee on Pest Control, the spirit of cooperation continued. Private, State and Federal personnel worked shoulder to shoulder to see the job through to a successful conclusion.

This report of operations has been prepared to describe the pest control project and to point out the benefits that can be derived from a cooperative venture.

BACKGROUND:

The Douglas-fir tussock moth (Hemerocampa pseudotsugata McD.) is an important defoliator of true firs and Douglas-fir in Western North America. Outbreaks of Douglas-fir tussock moth sometimes develop almost explosively, but after a year or two may subside abruptly. Some outbreaks have persisted at low levels for as long as eight years, but the average life of an outbreak has been five

years. Defoliation by the tussock moth not only retards tree growth but may kill trees outright.

In 1946 and 1947, an explosive population of Douglas-fir tussock moth infested nearly 500,000 acres of farm woodlots and forests in Eastern Washington and Northern Idaho. In this infestation as much as 75% of the true firs and Douglas-fir on small acreages were killed. In addition, large numbers of weakened Douglas-fir were killed by a secondary attack of the Douglas-fir bark beetle.

During the late spring of 1947, a control project was launched using one pound of DDT per gallon of diesel oil carrier per acre. The mixture was applied aerially using fixed-wing aircraft operating from temporary airstrips constructed at points close to the timber type. The insecticide was applied with little concern for people, towns or other similar areas. The operation, though primitive by standards now in use, was successful in controlling the outbreak.



PLATE I. Grand fir, first year attack by Douglas-fir tussock moth. Note typical webbing.

In 1961 Region 1, U. S. Forest Service insect condition reports noted the presence of tussock moth in widely scattered locations near farm buildings and in towns from Genesee, Idaho in the south to Bonners Ferry, Idaho on the north. Subsequent reports in 1962 and 1963 reported increases in some areas but, generally, the infestation was endemic or declining.

The 1964 evaluation presented a much more disturbing picture. A large area between Moscow and St. Maries, Idaho showed severe damage. Intensive ground survey in the fall of 1964 determined that tussock moth was present in epidemic numbers on 205,000 acres and that an additional 115,000 acres supported a light infestation. Entomological evaluation indicated that natural parasites were not present in sufficient numbers to control the population before severe damage was done to the timber resource. In the area infested, there exists an embryonic Christmas tree industry, a valuable sawtimber resource as well as a heavily used

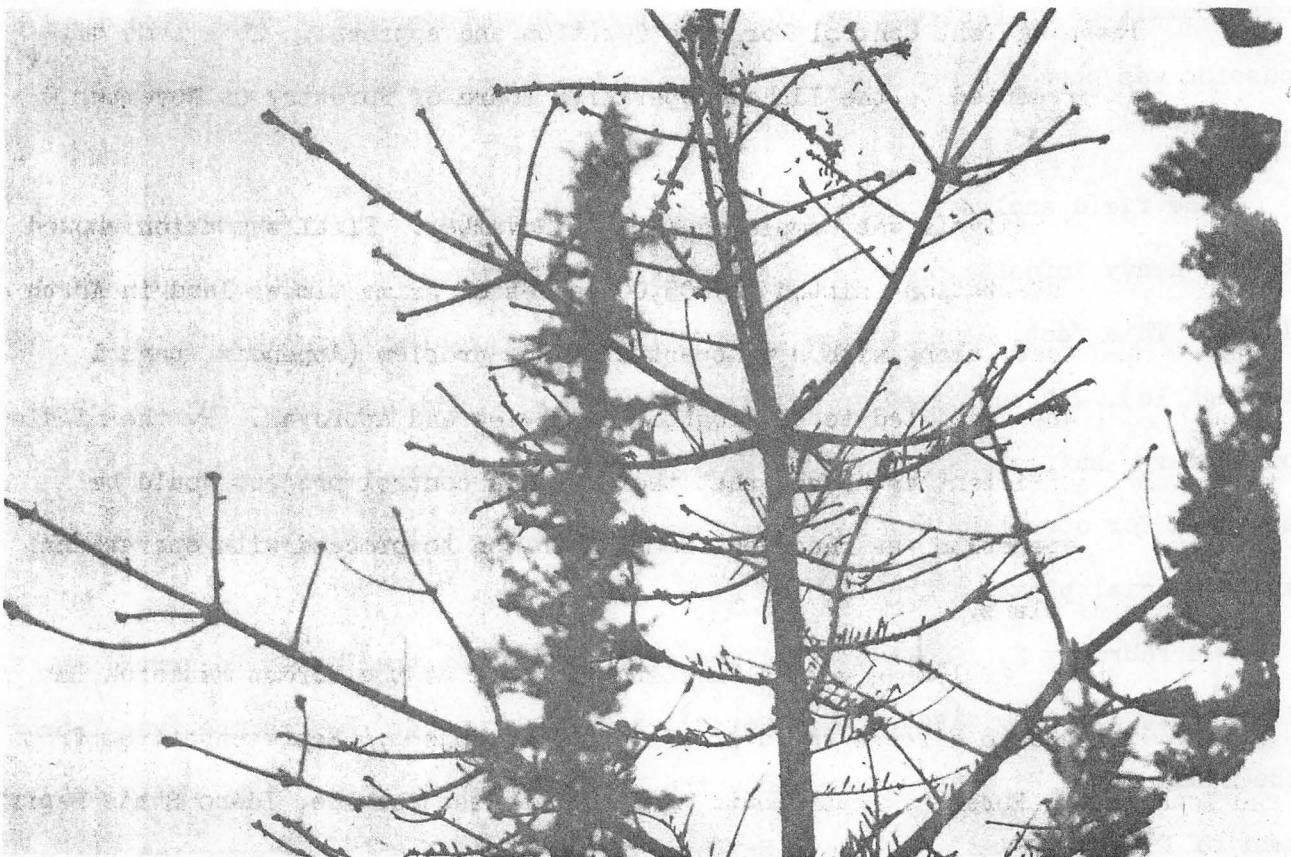


PLATE II. Result of two years defoliation by Douglas-fir tussock moth. Grand fir sapling.

aesthetic and recreational resource. Timber loss alone, if the infestation were to run unchecked, was anticipated to be \$15 to \$20 per acre, not including growth loss. Of the 205,000 acres heavily infested, ownership was 67% private, 10% State and 23% Federal.

PLANNING:

During late September and October, St. Joe National Forest personnel undertook an intensive ground survey to determine the extent of the infestation. The survey was not completed in time for a North Idaho Forestry Association Meeting on November 6; however, preliminary data was discussed at the meeting showing 190,000 acres of epidemic infestation of the Douglas-fir tussock moth. Mr. Homer Hartman, Branch Chief in charge of Insect and Disease Control, from the Regional Office in Missoula, Montana described the insect, the damage which it causes and a tentative control program, including cooperative financing. The consensus of the group was that the proposed control project should be presented to the Federal Committee on Pest Control for consideration and approval. This same discussion was presented to the Idaho Cooperative Board of Forestry on November 9, 1964.

The field analysis was completed in late November. Final summation showed that a heavy infestation existed on 205,000 acres of prime timber land in North Idaho. This fact, along with a prospectus of the problem (Appendix, page 1 through 1c), was submitted to Washington for review and approval. By the middle of January, sufficient assurance that the proposed control project would be approved for operation was received from Washington to proceed with operational and financial plans.

On February 2, 1965 a general meeting was held at the Forest Research Lab in Moscow, Idaho to discuss the over-all control project. Representatives from the Idaho State Forestry Department, the U. S. Forest Service, Idaho State Department of Fish and Game, the Idaho Extension Service, the Soil Conservation Districts,

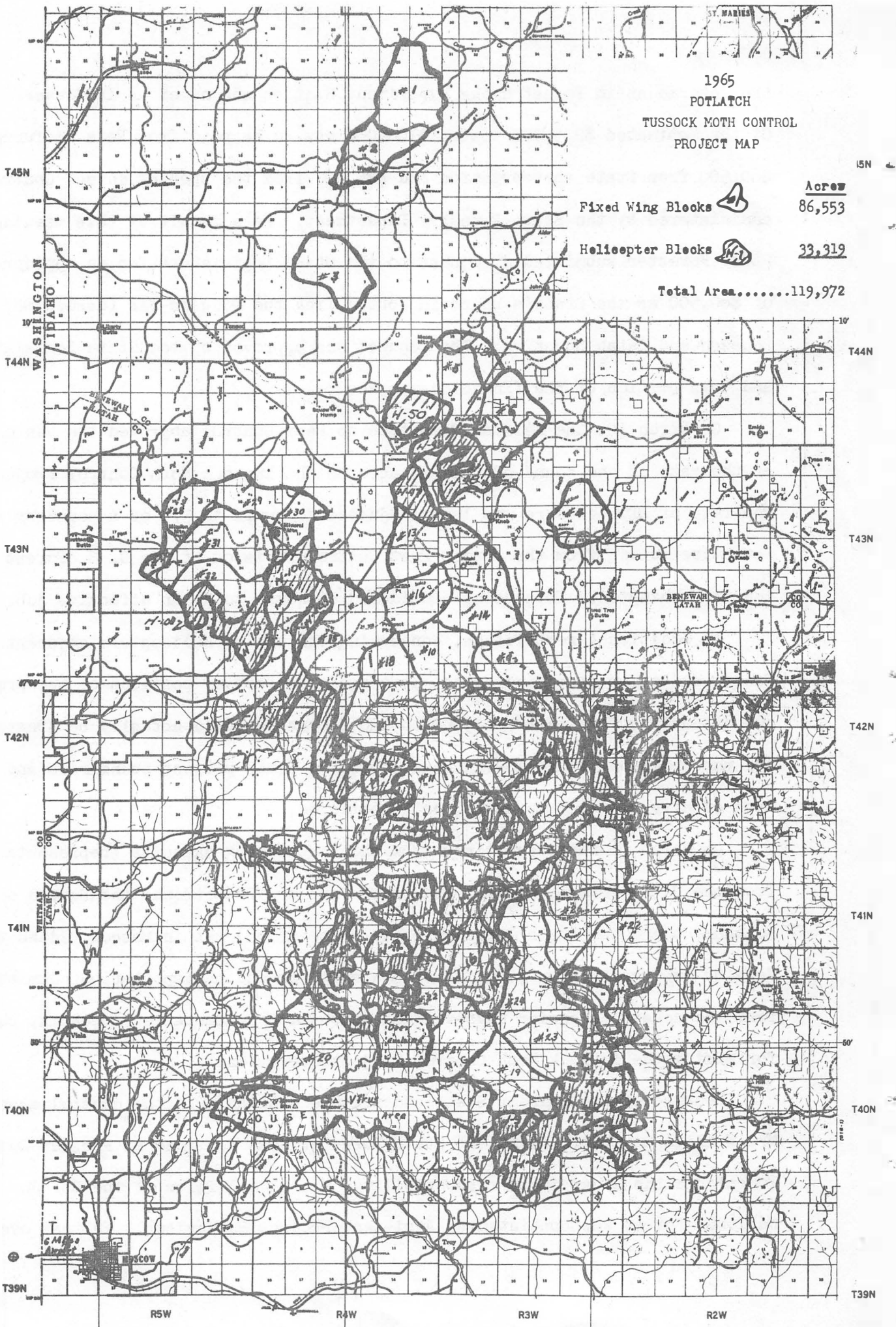
the Intermountain Forest Range Experiment Station and numerous landowners attended. Of the estimated \$205,000 costs, \$100,000 was to be paid from Federal funds, \$60,500 from State appropriation and \$44,500 from the special Insect Control Fund, administered by the State Forestry Department. As a result of this meeting, the State Forester submitted a request to the State Legislature for an appropriation of \$60,500 as the State's share in controlling the Douglas-fir tussock moth in Benewah and Latah Counties. The request was approved by the State Legislature, and this portion of the financing was secure.

On March 12, the Federal Committee on Pest Control approved the use of DDT at the rate of one pound of DDT per acre on the Tussock Moth Control Project. The rate of DDT per acre was later adjusted downward to $3/4$ of a pound by administrative ruling from the Forest Pest Control Division of the U. S. Forest Service in Washington. This being considered adequate to do an effective job.


An additional restriction, concerning the use of helicopters adjacent to fields and other sensitive areas, increased the cost of portions of the project so that only an estimated 115,000 to 120,000 acres could actually be treated. The map shown on the following page shows the final project boundaries and the type of aircraft used to apply the insecticide.


On March 16 representatives from the cooperating agencies (representative from the U. S. Forest Service, the State Forestry Department, the Bureau of Land Management and the North Idaho Forestry Association) met in Moscow, Idaho to develop an organization plan, to obtain manpower and transportation commitments from the several agencies involved and to develop a timetable (Appendix, page 2) for making the Tussock Moth Control Project operational.

Because of predominant State and private ownership in the control area, Mr. William Scribner, Assistant State Forester, was assigned as Project Supervisor. To balance the supervisory responsibility, Mr. Clyde Miller of the St. Joe National Forest was appointed as Assistant Project Supervisor. In that over 500



1965
POTLATCH
TUSOCK MOTH CONTROL
PROJECT MAP

Fixed Wing Blocks  Acres
86,553

Helicopter Blocks  33,319

Total Area.....119,972

woodland owners were involved in the project area, the State assumed leadership in the I & E effort. The problem analysis and plan of I & E was to be prepared jointly by the Forest Supervisor, St. Joe National Forest and the State Forester. The Forest Service assumed responsibility for obtaining services of an insecticide contractor and a fixed-wing contractor, in addition to detailing contract helicopters to the Tussock Moth Control Project from other areas within Region 1. The State Forestry Department was to establish a Zone of Infestation (Appendix, page 3) and arrange for use of appropriate air fields.

Technical entomological services and advice pertinent to overall operation was to be provided by the Region 1, U. S. Forest Service. The St. Joe National Forest was to prepare the control maps, including an aerial mosaic, spray block delineations and acreage computations. Additionally, the St. Joe Forest was to prepare a complete operational plan.

Forest industry and the Potlatch T.P.A. furnished seven men, Idaho State Forestry Department - eleven, including the Project Supervisor and the Idaho Fish and Game Department, one to serve as Monitoring Coordinator. The balance of the personnel were furnished from regular forces of the U. S. Forest Service. The roster of all personnel used on the project is in the Appendix, pages 4 and 4a.

On April 5, the organizational plan (Appendix, page 5) was presented to the Cooperative Board of Forestry at its semi-annual meeting in Boise, Idaho. The Board approved the use of \$40,000 from the insect control fund on the Project. This completed arrangements for financing.

On April 7, a meeting was held in Moscow with representatives from the Fish and Game Department, State Forestry Department, U. S. Forest Service and the University of Idaho to determine a satisfactory plan for minimizing the effects of the spray operation on resident fish and game populations. The main Palouse River, Strychnine Creek, Meadow Creek, Mannering Creek, White Pine Creek and Upper Spring Valley Creek were declared as critical streams to protect from direct application

of DDT spray. Other streams in the area, while they supported fish populations, were not considered to be of sufficient value to justify the expense of avoiding the stream course. The Hatter Creek deer enclosure was designated an area which should be left out of the spray program, since long-range deer studies are in process. The consensus of the meeting was that monitoring for monitoring's sake alone was not practical on this project. Trends of buildup of DDT and its derivatives in adipose tissue have been established in other spray projects. The monitoring, in this case, as far as wildlife are concerned, was to be designed only to collect sufficient data to make a logical evaluation of unusual buildup of chlorinated hydrocarbons in adipose tissue and to warn the public if a serious buildup did, in fact, exist.

The Fish and Game Department was to collect wildlife samples as specified in the six-point plan (Appendix, page 6). The samples were to be processed at the State Health Department Lab in Boise and the cost of analysis borne by the project.

Stream sampling for insect kill was to be made by Fish and Game Department personnel. The materials required and building of the collection boxes was to be borne by the project.

INFORMATION AND EDUCATION:

A brief but effective I & E plan (Appendix, page 7 and 7a) was developed jointly by the State Forester and the Supervisor of the St. Joe National Forest. Basically, the plan specified the routing and coordinating of news releases so that the two agencies involved in the administration of the project would be kept advised. It provided for personal contacts with the State and Federal Agencies and certain community leaders by the State Forester, by the St. Joe Forest Supervisor, by industrial representatives and by State Woodland Foresters on a local basis. It also provided for local meetings to contact the individual landowners. A copy of this plan is included in the report.

Individual contacts were made on schedule and local community meetings were



PLATE III. Information Booth at the headquarters, Pullman-Moscow Airport.

inaugurated during the week of April 12-16. Over 750 letters (Appendix, page 8) were sent to landowners within and immediately adjacent to the project area. The letter included a brief description of the project, specified purpose of the meeting and provided the dates and locations of five community meetings, one each in Moscow, Deary, Princeton, Tensed and Troy, Idaho. In addition to the letter, a general news announcement was made prior to the meeting. The meeting agenda included a brief discussion of the project area, the methods of control and organization of the operation. A movie entitled, "Operation WHIP", produced by the Washington Department of Natural Resources, describing the hemlock looper control project in the State of Washington during 1963 was shown to illustrate the methods by which spray operations would be carefully controlled. After the movie, the meeting was declared open to general discussion. These meetings generated only questions, with no opposition developing to the spray project.

The I & E Officer did not become active on the project until June 8, just prior to start of field operations. His responsibility on the project was to provide news media contact during the operational phases and to provide a contact with the general public interested in the spray operations. Additionally, the I & E Officer was intended to assist in hot spotting on problem areas that might develop during the operational phase of the Tussock Moth Control Project.

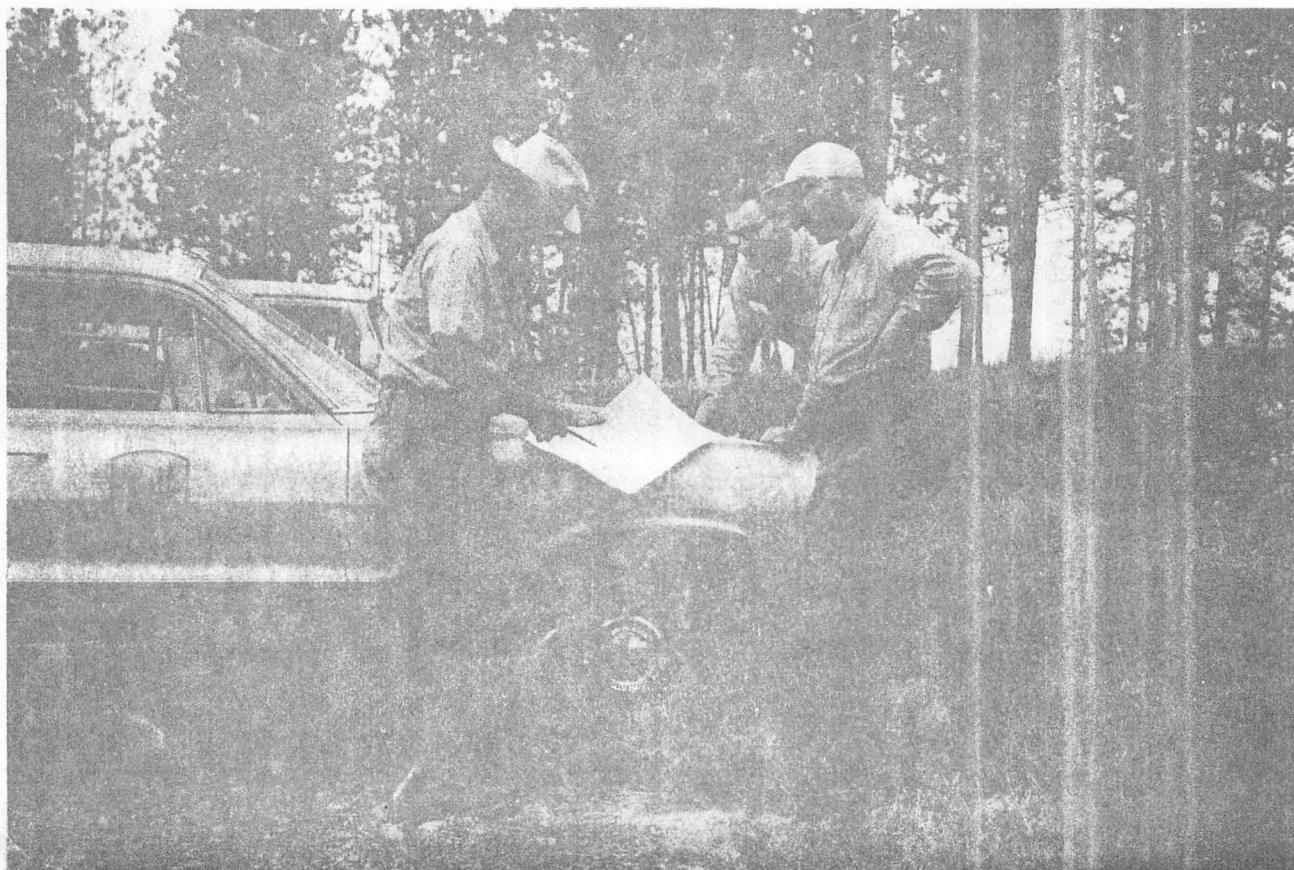


PLATE IV. Planning the attack. L to R. William Scribner, Project Supervisor; Dan Kucera, Project Entomologist; Clyde Miller, Assistant Project Supervisor.

OPERATIONS:

The detailed operational plan for the Tussock Moth Control Project is available in the files of the agencies involved in the project. A brief resume' of this operational plan is presented below.

Administration:

Two administrative centers were established for the operational phase. One at the Pullman-Moscow Airport and the other at the Potlatch Work Center of the U. S. Forest Service. The Project Supervisor, the Field Operations Officer, the Safety Officer, Formulation Checker, Contracting Officer and the I & E Officer operated from the Pullman-Moscow base. The Assistant Project Supervisor, the Technical Assistant, the Administrative Assistant, the Entomological Section, the Weather Checkers and the Helicopter Units operated from the Potlatch Work Center.

Business Management:

This function was primarily the function of the U. S. Forest Service because the aircraft and insecticide contracts and the majority of personnel were under direct Forest Service supervision. Funds to cover the major portion of the State and private financial obligations had been placed in a Cooperative Work Fund prior to the operational phase of the project. Final adjustments of project financing were to be made upon completion of the project.

A clerk was located at the Pullman-Moscow Airport to keep track of insecticide deliveries, aircraft flying time and Forest Service personnel time records. This information was sent daily to the project Administrative Assistant located at the Potlatch Work Center where fiscal information was compiled for the overall project.

Some difficulties were encountered because of the involvement of Cooperative Work Funds. No serious problems developed, however, and, in total, the business management function was satisfactory.

Communications:

Radio communications were provided by the St. Joe National Forest, using the Forest Radio net. A base station was installed at the Pullman-Moscow Airport and a remote control station was established at the Potlatch Work Center. These two units, in conjunction with portables and mobiles, provided adequate communications.

Telephones were provided at the Pullman-Moscow Airport, at the entomologists office, and at the administration office of the project work center. This system provided good communications for the entire operation.

Transportation:

Vehicles were furnished by the State, Federal and private agencies furnishing manpower to the project. Development Checkers and weathermen were equipped with four-wheel drive units which permitted them access to all points on the project. Transportation was adequate.

Safety:

Comprehensive safety plans were developed for both the fixed-wing and the helicopter operations. The plan followed guidelines laid down in FSM and FSH 5700 and the Health and Safety Code of the United States Forest Service. The objective was to prevent any accident or injury. This objective was fulfilled completely.

Air Operations:

Air operations were divided into two sections: the fixed-wing operation based at the Pullman-Moscow Airport and the helicopter operation based at the Potlatch Work Center but operating two units from heliports established close to the helicopter spray blocks. Five heliports were constructed for helicopter spray bases. The landing pads were located on Mineral Mountain, at the gravel pit near Sanders, Macumber Meadows on Big Creek, Wayne LaRue ranch near Princeton and on the Ralph Howell ranch near Deary.

The fixed-wing operation included two contractor-owned spray planes, a B-17 and a C-39; two contractor-owned observation craft, a Cessna 180 and a Cessna 205, and, intermittently, one U. S. Forest Service owned Cessna 180.

The helicopter operation involved eight helicopters, listed in Table I, operating as two separate units. The helicopters operated under U. S. Forest Service contract on a force account basis.

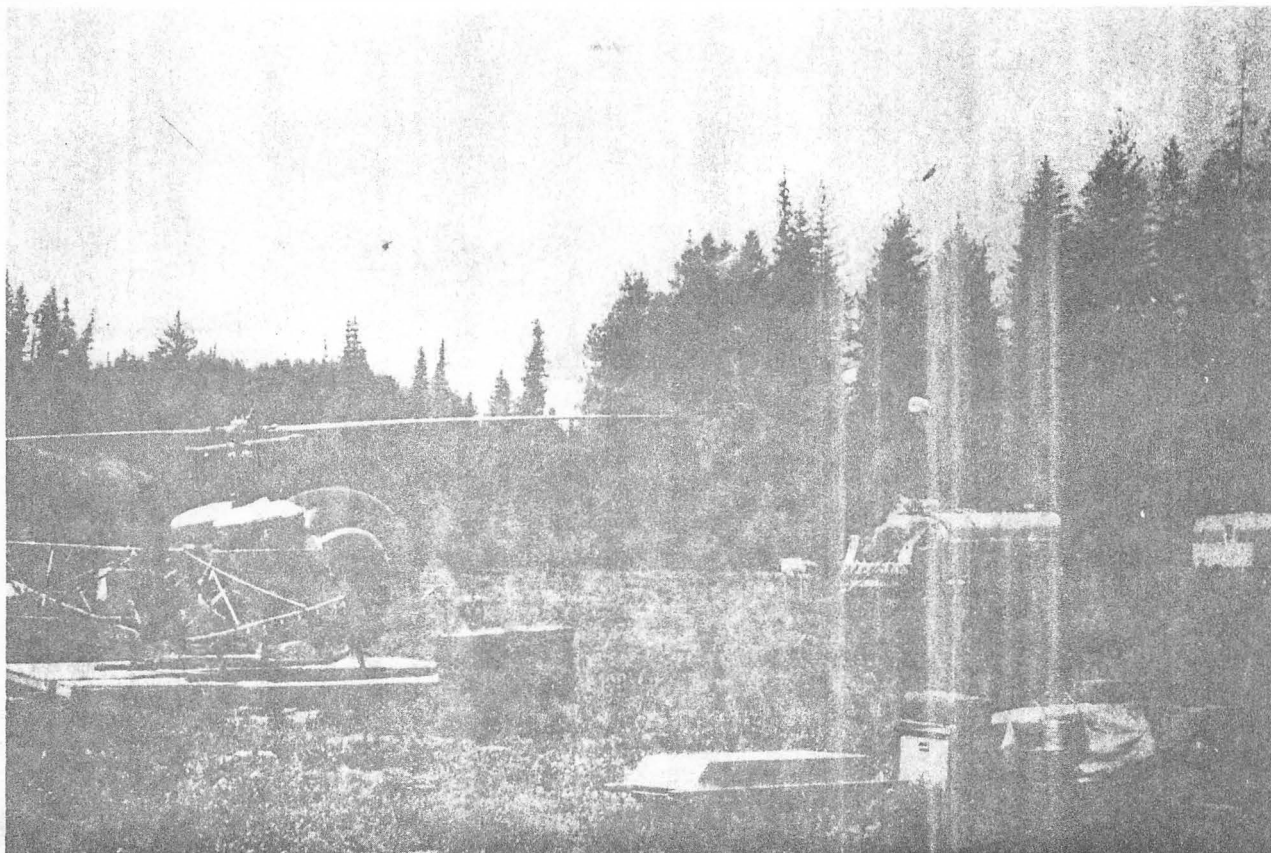


PLATE V. Typical heliport layout. Helicopter is in position for loading, insecticide trailer in the background.

Table I. Contract Helicopters Used on the Project.

<u>Helicopter Make and No.</u>		<u>Company</u>	<u>Pilot</u>
Hiller - 12E	#N5360u	Shasta Helicopter San Jacinta, Calif.	Darrell Sucher
Bell G - 3B - 1	#N73946	Johnson Flying Service R. Kvanme Missoula, Montana	
Bell 47 G3B	#N73224	Johnson Flying Service E. W. Nelson Missoula, Montana	
Bell G3	#N8409E	Johnson Flying Service R. Snider Missoula, Montana	
Bell G3	#N8414E	Johnson Flying Service William Wiles Missoula, Montana	
Bell G3B	#N73221	Hillcrest Aircraft Lewiston, Idaho	Jerry Wilson
Bell G3B-1	#N73939	Hillcrest Aircraft Lewiston, Idaho	Benjamin Merrill
Bell G3B-1	#N73287	Empire Helicopters Spokane, Washington	A. C. Green B. D. Miller

Table II. Fixed-Wing Spray Block Summary.

<u>Block No.</u>	<u>Control Unit</u>	<u>Planned and Sprayed Acres</u>
1	Bnewah Creek	2623
2	Windfall Creek	2141
3	Lolo Creek - Tensed	2330
4	East Dennis	2377
5	Indian Creek	2989
6	Latah Creek	3302
7	Strychnine Creek	1708
9	East Fork Big Creek	2946
10	Olevan - Hope Creek	3078
11	Camas Creek	5219
12	Last Chance Creek	3028
13	Tenas Creek	2607
14	Meadow Creek	3682
15	Crane Creek	3502
16	Upper Meadow - Issick Creek	1812
17	Waterhole Creek	822
18	Gold Creek	4707
19	West Fork Bear Creek	3050
20	Rocky Point	4963
21	Flat Creek	3391
22	Hatter Creek	890
23	Howell Creek	2583
24	Flat Creek - Yale	4119
25	Ruby - Quartz Creek	2151
26	Queener Creek	2830
27	Little Bear Creek	3549
28	East & Middle Fork Mission Creek	1659
29	Sheep Creek	1620
30	Mineral Creek	1501
31	Mineral Mtn. West	3489
32	Middle Fork Deep Creek	1885

86,553 Acres

Table III. Helicopter Spray Block Summary.

<u>Block No.</u>	<u>Control Unit</u>	<u>Planned Acres</u>	<u>Sprayed Acres</u>
H-1	Dry Creek	342	342
H-2	West Fork Bear Creek	1037	980
H-3	Howell Creek	610	610
H-4	Stanford Pt.	1268	1190
H-5	Middle Fork Bear Creek	827	700
H-6	Yale	953	840
H-7	Little Bear Creek	645	630
H-8	Nora Creek #1	1205	840
H-9	Nora Creek #2	993	980
H-10	Long Creek	763	763
H-11	Turnbow Gulch	1338	1330
H-12	Hatter Creek #2	834	830
H-13	Turnbow Point	1076	1075
H-14	Morrissey Creek	631	630
H-15	Heath Gulch	899	860
H-16	Flat Creek #1	1001	980
H-17	Flat Creek #2	1082	1082
H-18	Moon Hill	981	980
H-19	Laird Park	1131	1055
H-20	Hatter Creek #1	1179	1179
H-44	Grouse Creek	1259	1050
H-45	Lost Creek	854	840
H-46	Cow Creek - Akers Gulch	682	682
H-47	Sanders	1264	900
H-48	Latah Creek	922	770
H-49	Indian Creek #1	747	630
H-50	Indian Creek #2	1056	1063*
H-80	Strychnine Ridge	456	420
H-100	Middle Fork Deep Creek #1	773	700
H-101	Middle Fork Deep Creek #2	978	960
H-102	East Fork Deep Creek #1	1003	1000
H-103	East Fork Deep Creek #2	974	970
H-A		1670	1670
H-B		890	890
H-C		760	760
H-D		1290	1290
H-84		848	848
		<u>35,221 Acres</u>	<u>33,319 Acres</u>

*Additional acreage included in H-50 prior to spraying.

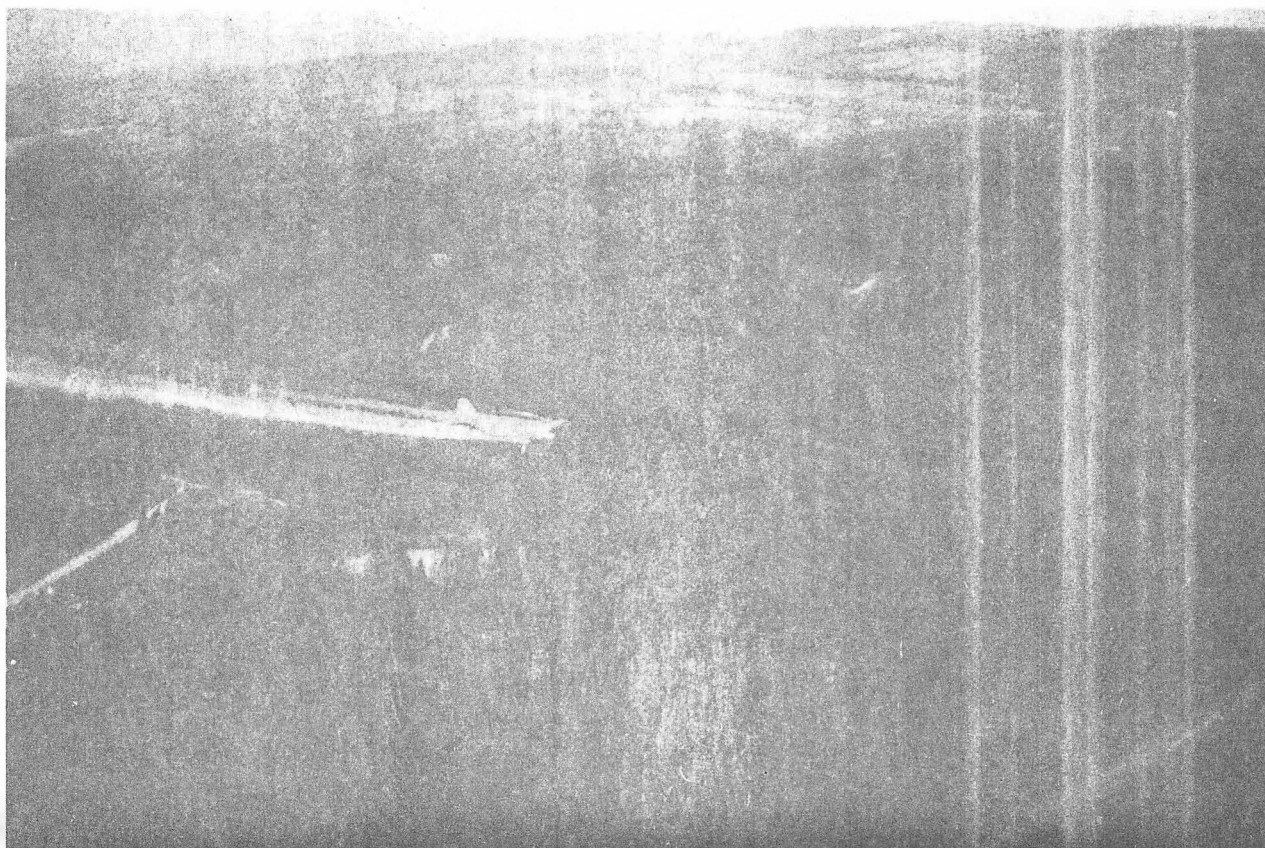


PLATE VI. C-39 applying insecticide in Block 23.

Fixed-wing spray and observation pilots were oriented each day by means of orientation flights over spray blocks released for the following day. The helicopter operation managers oriented each helicopter pilot prior to the start of spraying in each block.

Entomology:

The tussock moth development crew began collections on June 16, one week before spray operations. However, egg masses were seen hatching on June 1. At the beginning, blocks were released for spraying when 10 percent of the larvae were in the third instar. In the heavily infested areas, defoliation was almost complete by this stage, so guidelines were set back to spray when 70 percent of the larvae were in the second instar.

In the laboratory, eggs hatched within a three day period, but in the field different egg masses on the same tree hatched over a period of at least 10 days (tagged egg masses). Some eggs were still hatching on June 24.

There were 14 mortality lines in the 36 helicopter blocks, and all but 2 blocks had spray card lines. Of the 30 fixed-wing blocks, 12 had mortality lines, and all but 1 had spray card lines.

Since there were as many as 288 larvae per 15-inch branch, only 5 to 10 plots were taken on each mortality line (8 to 16 chains apart) due to limited manpower.

The prespray helicopter mortality lines had a total of 1,372 larvae, and the fixed-wing had 2,416 larvae. Six days after spraying, no larvae were found. Pre-spray counts consisted of one 15-inch branch per tree and two trees per plot, while post-spray counts had two 15-inch branches per tree and two trees per plot.

Spray Coverage:

Oil sensitive cards were placed at predetermined locations in the spray blocks before release for spraying. The cards bore serial numbers in sequence



PLATE VII. Typical location of oil sensitive card (near side of stump) and string line.

and were laid out on string lines at 4-chain intervals. Card lines were also laid in the buffer strips along the fishery streams and in the buffer strips adjacent to the designated sensitive areas.

Spray coverage within the blocks was excellent and the cards laid in the buffer strips showed little or no spill over from the spray blocks. This fact is a tribute to the pilots of both the fixed-wing spray planes and the helicopter pilots.

Insecticide:

The insecticide was furnished under contract by the Lennington Corporation of Vancouver, Washington. The Agricultural Research Service Laboratory at Yakima, Washington checked the chemical composition and the amount of DDT in each batch.

The solution was mixed at a central batch plant located on a rail siding in the town of Pullman, Washington. The approved formulation was delivered by tank

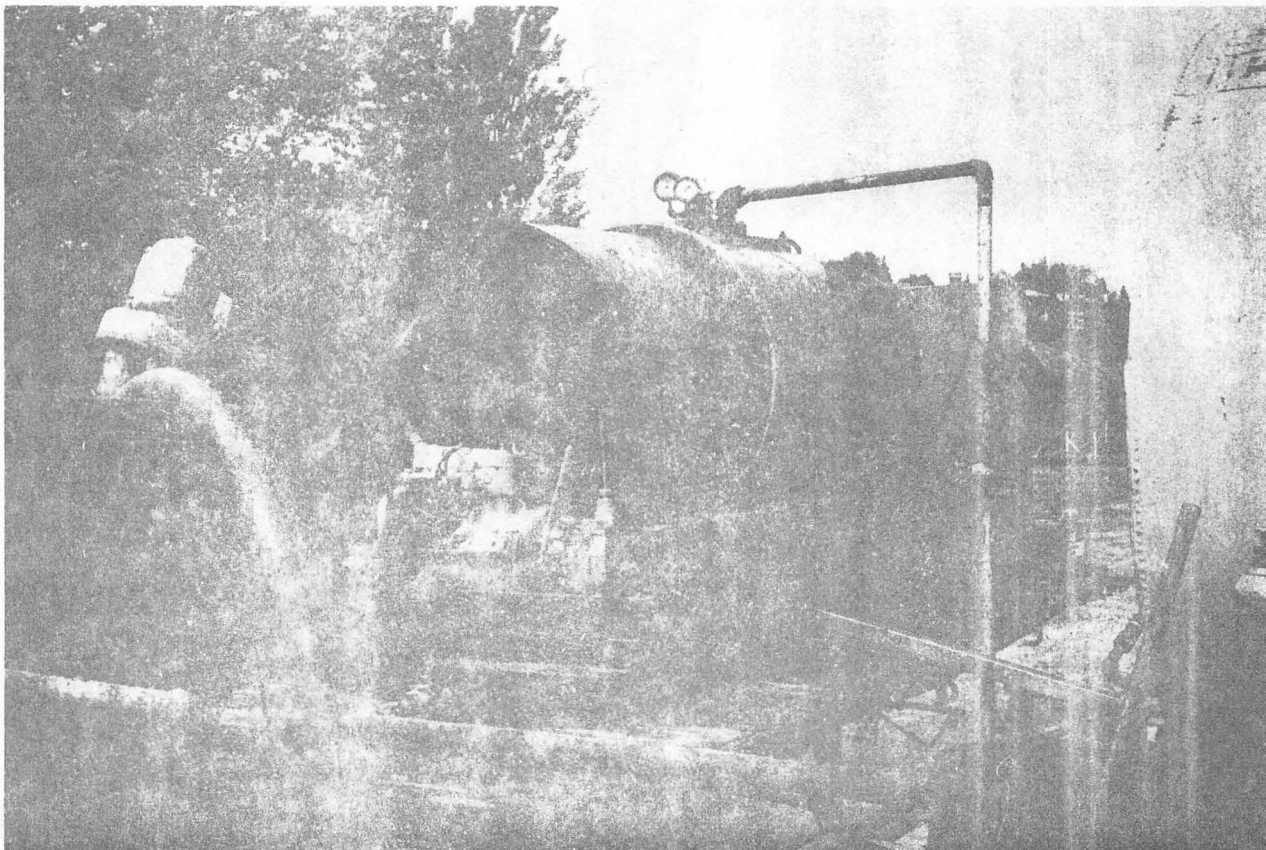


PLATE VIII. Central batch plant. Mixing hopper on left, oil heating center, storage tank on right.

truck to two operational storage tanks. One 20,000 gallon tank located at the Pullman-Moscow Airport for the fixed-wing and one 10,000 gallon tank at the Potlatch Work Center for the helicopters.

The insecticide was placed aboard the fixed-wing aircraft at two loading stations by means of metered transfer pumps.

For the helicopters, the insecticide was transported to the field from the Potlatch Work Center in tanker trucks diverted from the BRC program. These tankers were equipped with pumps capable of transferring the insecticide to mobile storage tanks at the heliports.

CONTRACTING:

Aircraft:

The helicopters used on the project were already under contract to the Forest Service and were used on a force account basis. Table IV below shows the production and flight time of the helicopters.

Table IV. Summary of the helicopter spray production.

<u>Helicopter</u>	<u>Type</u>	<u>Acres Sprayed</u>	<u>Gallons Sprayed</u>	<u>Spray Hours</u>	<u>Recon. Hours</u>	<u>Ferry Hours</u>	<u>Total Flight Hours</u>
N8409E	Bell G-3	2,042	2,077	13.8	.5	2.8	17.1
N73946	Bell G 3B-1	2,644	2,680	11.7	.9	3.1	15.7
N73224	Bell 47 G3B	3,886	3,957	24.4	2.2	4.5	31.1
N8414E	Bell G-3	3,816	3,887	23.1	1.8	2.8	27.7
N73939	Bell G 3B	4,756	4,827	30.4	2.0	3.0	35.4
N73221	Bell G 3B	5,484	5,590	43.2	2.0	3.1	48.3
N5360u	Hiller 12E	4,719	4,790	29.1	1.9	6.4	37.4
N73287	Bell G 3B-1	<u>5,972</u>	<u>6,079</u>	<u>36.0</u>	<u>1.6</u>	<u>6.0</u>	<u>43.6</u>
TOTAL		33,319	33,887	211.7	12.9	31.7	256.3

The fixed-wing contract called for single engine spray aircraft of not less than 1750 HP or multi-engine aircraft with engines of not less than 1800 HP each. These aircraft were equipped with applicator systems capable of applying insecticide mist with a mass median diameter of not less than 150 microns or larger than 250 microns in an in-flight operating condition. Swath widths were to be at

least three times the wing span of the aircraft. Maintaining at least 2900 acres per hour production was required of spray aircraft after the first six hours of spray time.

In addition to the spray aircraft, the contractor was required to furnish a maximum of three four-place observation aircraft with at least 220 HP engine rating. Estimated observation time was 75 hours.

Madras Air Service, d.b.a. Aurora Air Inc., was the successful bidder. The spray aircraft were a B-17 and a C-39. The observation aircraft were a Cessna 180 and a Cessna 205. The bid was 23.77¢ per acre for the insecticide application and \$30.00 per hour for the observation aircraft. Table V shows the production and flight hours for the two spray planes. (See following page for Table V).

The contractor's ships were in excellent condition and the pilots were most competent. Only 500 acres in Block 39 required respray out of the total contract acreage of 86,553. Failure of an air driven pump on the B-17 required dumping 976 gallons of insecticide over Block 11, the insecticide was gradually released through loading valves while the plane circled over the block at a fairly high elevation to disperse the released chemical. The load was dumped during the last spray day on June 24.

Insecticide:

The insecticide contract called for a formulation of three-fourths of one pound of DDT per gallon of diesel oil. Two delivery points were specified, Pullman-Moscow Airport for the fixed-wing operation and Potlatch Work Center for the helicopters.

The contractor was required to furnish a 20,000 gallon storage tank and loading stations as required by the spray contractor. A 10,000 gallon storage facility with a transfer pump was required at the Potlatch Work Center.

The Lennington Corporation was the successful bidder with a price of 38.75¢

Table V. Summary of Fixed-Wing Spray Production.

C-39 AIRCRAFT

<u>Date</u>	<u>Flight Time</u>	<u>Gallons DDT Sprayed</u>	<u>Acres Sprayed</u>
6-16-65	2 hours 27 minutes	4019	4019
6-17-65	2 hours 53 minutes	3651	3651
6-19-65	4 hours 7 minutes	6537	6467
6-20-65	3 hours 32 minutes	5634	5599
6-21-65	4 hours 45 minutes	6765	6751
6-22-65	2 hours 52 minutes	4882	4845
6-23-65	4 hours 1 minute	7000	7000
6-24-65	2 hours 30 minutes	<u>3252</u>	<u>2700</u>
SUB-TOTAL 27 hours 7 minutes		41,740 gallons	41,032 acres

B-17 AIRCRAFT

<u>Date</u>	<u>Flight Time</u>	<u>Gallons DDT Sprayed</u>	<u>Acres Sprayed</u>
6-17-65	2 hours 43 minutes	6055	6018
6-19-65	1 hour 21 minutes	2850	2771
6-20-65	3 hours 12 minutes	8990	8930
6-21-65	3 hours 3 minutes	7300	7286
6-22-65	3 hours 5 minutes	7106	7016
6-23-65	2 hours 57 minutes	8879	8879
6-24-65	1 hour 57 minutes	<u>5697</u>	<u>4621</u>
SUB-TOTAL 18 hours 18 minutes		46,877 gallons	45,521 acres
GRAND TOTAL 45 hours 25 minutes		88,617 gallons	86,553 acres

The Cessna 205 flew a total of 28 hours 53 minutes and the Cessna 180 flew 32 hours and 47 minutes. Total observation time, including pilot orientation, was 61 hours 40 minutes.

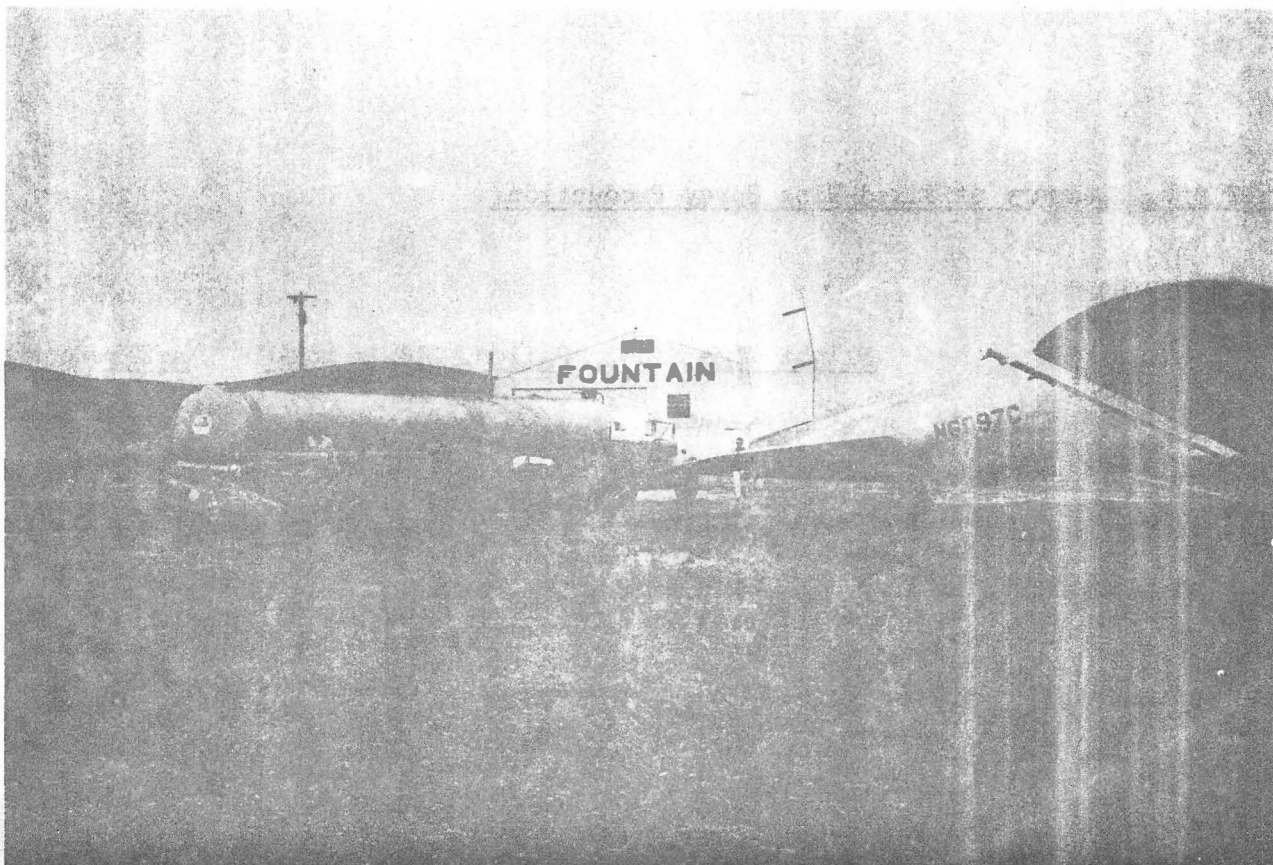


PLATE IX. Tanker delivering insecticide to storage tank at Pullman-Moscow Airport. Aircraft loading equipment is on small trailer.

per gallon delivered to the Airport and 39.75¢ per gallon delivered to Potlatch.

All contracts were the responsibility of the U. S. Forest Service. Inspection personnel were furnished to insure compliance with both aircraft and insecticide contracts.

MONITORING:

Difficulty was experienced by Fish and Game Department personnel in collecting prespray samples of grouse and deer as specified in the six-point plan. However, samples of grouse and deer were collected and adipose tissue samples analyzed from post-spray collections prior to the opening of the grouse and big game seasons.

Two of the grouse collected showed high accumulations of DDT and its derivatives, and, as a result, a news item was prepared cautioning users to remove

fat from grouse. The adipose tissue samples collected from the deer all showed DDT below the 7ppm considered an acceptable level in domestic livestock.

Drift net samples were taken in Big Creek, Strychnine Creek and the Palouse River just prior to and immediately after adjacent blocks were sprayed. The post-spray sample of Big Creek showed large numbers of dead aquatic and terrestrial insects. The post-spray samples of Strychnine Creek and the Palouse River showed no increase in drifting dead insects. Drift net sampling and observation on Big Creek, Strychnine Creek and the Palouse River after the project showed that aquatic insect populations were again normal or remained abundant.

No mortality was noted in the fish populations of any of the streams.

Table VI. Results of adipose tissue analysis to ruffed grouse samples.

Sample #	Collection Area	DDT	DDD	DDE	Total DDT	Aldrin*
1	Block 20	0.29	0.84	0.65	1.78	-----
2	Block 20	-----	3.21	-----	3.21	0.47
3	Block 18	-----	3.83	-----	3.83	0.61
4	Block 9	7.04	15.93	-----	22.97	1.26
5	Block 20	1.29	1.51	-----	2.80	0.183
6	Block 20	0.16	0.90	-----	1.06	0.116
7	Block 20	0.09	1.04	-----	1.13	0.17
8	Block 10	1.97	4.83	-----	6.80	0.15
9	Block 10	11.5	29.9	-----	41.4	0.3
10	Block 10	2.7	3.1	-----	5.8	0.2

*The source of this material has not been determined. Analysis of insecticide used on the project showed no compounds other than DDT, DDD and DDE.

Table VII. Results of adipose tissue analysis of white-tailed deer samples.

Sample #	Collection Area	DDT	DDD	DDE	Total DDT
1	Block H-45	0.16	4.0	0.16	4.32
2	Block H-45	0.42	1.8	0.26	2.48
3	Block H-45	0.71	1.6	0.48	2.8
4	Block H-3	1.46	3.8	0.84	6.1
5	Block H-15	0.55	1.4	0.08	2.0
6	Block H-7	0.02	0.18	0.04	0.24
7	Block H-13	0.11	0.46	T	0.6

PROJECT COSTS:

The \$133,624 cost of the project was less than the original estimate of \$200,000. This was due to two factors: (1) the final acreage was reduced because of sensitive area protection, and (2) favorable contracts and weather reduced actual cash outlays. Tables VIII, IX and X following, summarize the cost figures for the project. The overall cost for the project was \$1.11 per acre average, the fixed-wing portion cost was \$0.9055 per acre and the helicopter portion cost \$1.658 per acre.

RECOMMENDATIONS:

On July 21, 1965 individuals involved in the administration of the control project met to discuss methods and material which would improve future projects' administration and operation. Discussed below are items which would have such a bearing.

Maps and Photographs:

The following maps and photographs were used on the project:

1. Semi-controlled Mosaics constructed from 1:15,840 photos.
2. Contact prints of 1:15,840 scale.
3. Contact prints of 1:60,000 scale.
4. USGS contour maps on scale of 1:62,500.
5. Blue line print maps on a scale of 2 inches = 1 mile.

The mosaics were not extensively used. Fixed-wing pilots preferred the 1:62,500 contour maps and aerial photos on a scale of 1:60,000. A large supply of the USGS contour maps, scale 1:62,500 should be available for the ground crews. The 2 inch = 1 mile maps were excellent for recording progress in all phases of this project.

Communications:

The forest radio net and commercial telephone provided adequate communication for the observers and ground forces.

Table VIII. Potlatch Tussock Moth Control Summary, Fixed-Wing.

Fixed-wing Plane - 86,553 acres
(Pullman-Moscow Airport)

USFS and BLM acreage - 16,420
State and private acreage - 70,133

Total cost fixed-wing---\$22,843.85 ÷ 86,553 = 26.39¢ an acre
(includes observation plane)

DDT Insecticide Costs

Pullman-Moscow Airport---	86,874.2 gallons insecticide @ 38.75¢	\$33,663.77
Less 1% discount		<u>-336.64</u>
		\$33,327.13

\$33,327.13 ÷ 86,553 acres = 38.50¢ an acre

Administration (actual amount paid)

State of Idaho	\$9,063.90
St. Joe Forest	17,226.43
Regional Costs	4,470.95
(Fire Control-\$1,390.35; AS-\$523.10; Per Diem and mileage-\$1,513.45; Project salaries-\$842.38; Miscellaneous-\$201.67)	
	<u>\$30,761.28</u>

\$30,761.28 ÷ 119,872 acres = 25.66¢ per acre

Fixed-Wing Cost per Acre = \$0.9055

Table IX. Potlatch Tussock Moth Control Summary of Expenditures, Helicopter.

Helicopter Use - 33,319 acres
(Potlatch Work Center)

USFS Acreage - 760
State and private acreage - 32,559

(Contract - \$27,306.20; Region 4 - \$1,260.87; Kaniksu - \$4,353.36)

Total cost helicopter - \$32,920.43 ÷ 33,319 = 98.80¢ an acre

Potlatch Work Center - 34,995.5 gallons insecticide @ 39.75¢ \$13,910.71
Less 1% discount -139.10
\$13,771.61

\$13,771.61 ÷ 33,319 acres = 41.33¢ an acre

Administration (actual amount paid)

State of Idaho	\$9,063.90
St. Joe Forest	17,226.43
Regional costs	4,470.95
(Fire control - \$1,390.35; AS - \$523.10; Per Diem	
and mileage - \$1,513.45; Project salaries - \$842.38;	
Miscellaneous - \$201.67)	
	<u>\$30,761.28</u>

\$30,761.28 ÷ 119,872 acres = 25.66¢ an acre

Helicopter Cost per Acre = \$1.658

Table X. Distribution of Project Cost by Funds and Functions.

	504(041) <u>Forest Service</u>	CWF <u>State</u>	<u>Total</u>
Fixed-Wing, Observation, Helicopter	\$23,929.76	\$31,834.52	\$55,764.28
Insecticide	20,398.82	26,699.92	47,098.74
Administration	<u>13,303.64</u>	<u>17,457.64</u>	<u>30,761.28</u>
TOTAL	\$57,632.22	\$75,992.08	\$133,624.30

Overall Project Cost per Acre:

\$133,624.30 ÷ 119,872 acres = \$1.11

Fixed-Wing Cost per Acre = \$0.9055

Helicopter Cost per Acre = \$1.658

The 123.9 MC systems in the spray planes, the observation craft and contractors control set at the Pullman-Moscow Airport were defective. Future contracts should require reliable 123.9 MC equipment in all contracted aircraft and either a 123.9 MC base station should be required as part of the contract or a set should be furnished by the project.

Assignment of a full-time radio technician to the project would be very desirable.

Information and Education:

This function was inadequately staffed for a project so closely associated with numerous small private ownerships. Supplemental positions should be provided to permit contact of all owners within each spray block one or two days prior to spraying. These supplemental positions could be used to alert the Project Supervisor of sensitive areas missed during the early planning stages.

Briefing of Personnel:

During the course of the project, it became apparent that many of the people involved, who had almost daily contact with the public, were not well grounded in problems incident to using DDT and precautionary measures to be taken to reduce chances of contamination.

A full day devoted to a comprehensive explanation of the project to all personnel, including contractors and contract pilots, would be well spent. Discussion of the importance of carefully controlled application should be directed at the pilots.

Weather Reporting:

The three weathermen were diligent and effective in providing weather information. The reporting schedule of 30 minute intervals tended to overload the radio system and such frequent reports were not necessary in all instances.

Reports of weather conditions before the aircraft are dispatched at the start of each spray day are important. Additional reports are considered to be

necessary only if weather conditions have changed appreciably or are approaching marginal conditions.

Spray Block Size:

Spray blocks in the fixed-wing contract ranged from 890 acres to 5,219 acres in size and tended to shapes that were difficult for the pilots to cover accurately. It was felt that by increasing block size to a maximum of 8,000 acres, by setting a minimum of 2,000 acres and by using an experienced spray pilot as an advisor, that more efficient spray patterns could be developed.

Airport Arrangements:

The Pullman-Moscow Airport was used as a base for the fixed-wing operation. A written agreement was obtained from the Airport Board stipulating conditions under which the airport could be used by non-resident spray planes. Because of this, no difficulties were anticipated.

Just prior to the start of the spray operations, an exclusive fueling franchise was discovered to be in existence. This instrument caused considerable delay and anxiety in addition to placing an unforeseen financial burden on the contractor.

Airport arrangements should be made far enough in advance to permit intensive, thorough search for unforeseen liabilities similar to that experienced here.

Post-Spray Evaluation:

The I & E position should be manned until a post-spray evaluation can be made and the information passed on to the public. There was considerable delay in this function because of the very rapid demobilization.

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DOUGLAS-FIR TUSSOCK MOTH (Problem Analysis)

THE INSECT

The Douglas-fir tussock moth is an important native defoliator of true firs and Douglas-fir. Outbreaks of the Douglas-fir tussock moth sometimes develop almost explosively but, after a year or two, may subside abruptly. However, some outbreaks have persisted at low levels for as long as 8 years. The average life of an outbreak is 5 years.

DAMAGE CAUSED

The Douglas-fir tussock moth is a quick killer of trees. Complete tree defoliation may occur in a single season. In heavy infestation centers, the needles of all conifers present are destroyed. Defoliation by the tussock moth not only retards tree growth but also kills trees. In 1956, on the Stanislaus National Forest in California, 60 percent of the white fir trees that were defoliated (90 percent by the tussock moth) failed to recover.

Many other trees were so seriously damaged that the tops died or the trees were killed by attacks of other insects and fungi. Mature grand fir trees are killed more quickly than younger age classes. Serious forest fire hazards develop in all heavily damaged stands.

THE OUTBREAKS

It is not known why tussock moth outbreaks occur. In 1964, extensive areas were infested in California, Oregon, Washington, Idaho and Montana.

The current Idaho tussock moth infestation was first detected in 1961 in and near several towns in Northern Idaho. These infestations were kept under surveillance during 1962 and 1963. It was suspected that the outbreak might decline before spreading into extensive forest stands. However, intensive ground and aerial surveys in 1964 detected tussock moth egg masses on 320,000 acres of forested lands in Benewah and Latah Counties, while the infestations in Bonner, Boundary and Kootenai Counties remained static or appeared to be declining.

Of the 320,000 acres of infested stands, 115,000 acres on the outer fringe of the main outbreak supported only occasional egg masses with no detectable defoliation. Most entomologists think that 1965 control efforts should be concentrated on the 205,140 acres of moderate to heavy infestation where tree mortality will occur in 1965.

The landownership of the main tussock moth infestation is:

<u>Landowner</u>	<u>Acreage</u>
Potlatch Forests, Inc.	40,030
Diamond National	1,940
Northwest Timber Company	680
Northern Pacific Railroad	760
Milwaukee Land Company	4,840
University of Idaho	3,600
State of Idaho	20,910
Small private (557 owners)	85,700
Bureau of Land Management	2,810
Coeur d'Alene Indians	220
National Forest	<u>43,650</u>
TOTAL.....	205,140

BIOLOGICAL EVALUATION

The 1964 biological evaluation of the Benewah-Latah tussock moth infestation indicates that heavy defoliation will occur in 1965 and that extensive tree mortality and damage will result.

Some polyhedral virus is present in the infested area. To attain a better knowledge of the amount of virus present, 10 egg masses each from 25 sample plots are being reared at the Forest Insect Laboratory at Corvallis, Oregon. This information will be available in early March 1965.

CONTROL METHODS

The only proven control method for the tussock moth is the aerial application of DDT at the rate of 1 pound per acre in 1 gallon of fuel oil. The cost per acre for this type of control is approximately \$1, which would break down as follows:

DDT insecticide formulated	\$0.36 per acre or gallon
Aerial application (flying)	.35 per acre
Observation planes	.05 per acre
Overhead--administration	<u>.24 per acre</u>

TOTAL.....\$1.00 per acre

Control through the aerial application of polyhedral virus has good potential, but has not been fully perfected and tested. Enough polyhedral virus is available to treat 50,000 acres at the rate of 100 million particles per acre. This should be applied to critical areas and pilot test areas.

The cost of treatment by virus would be about the same as DDT. Treatment by virus would save little of the tree foliage in 1965 that would have been consumed by the tussock moth if no control was applied.

STAND VALUES

The infested stands represent some of the most productive and accessible forest lands in Idaho. The annual yield per acre ranges between 200 and 250 board feet. The current stumpage value is about \$5 per thousand. The growth loss alone after 2 years' defoliation would more than pay for the cost of the project. In addition to growth loss, heavy tree mortality will occur in patches throughout the 205,000 acres of moderate to heavy infestation. The currently thriving Christmas tree industry will be lost for several years if no control action is taken. It is estimated that the total dollar loss per acre would average between \$15 and \$20 if no control action is taken. This means that the total stand loss would be 15 to 20 times the cost of control. In addition to this, there would be a considerable loss in the aesthetic values plus the high forest fire hazard potential created by the dead trees.

OTHER VALUES

Within the spray area there are only a few fishing streams and these are of poor quality. However, the tussock moth infested area, for the most part, is well stocked with elk, deer and upland game birds.

The Troy municipal watershed and possibly other watersheds, plus all critical or sensitive areas, would need to be treated with virus.

FINANCES

The project would be financed as follows:

1. The Forest Service would pay the total cost of spraying Federal lands plus one-third of the cost of spraying all State and private lands; total Forest Service cost -- \$100,000.
2. The State of Idaho will pay for two-thirds of the treatment cost on all State lands plus one-half of the cost to private owners; total State of Idaho cost -- \$60,000. This \$60,000 must be secured by a special appropriation of the Idaho State Legislature.
3. The remaining cost for treating private lands will be paid from the State of Idaho emergency pest control 5 percent slash fund. Estimated cost -- \$45,000. This would give a grand total of \$205,000. All funds are currently available except the \$60,000 from the State of Idaho.

PROJECT REVIEW

It is expected that this project will be reviewed by the Federal Committee on Pest Control in early March. If the project is not approved for DDT, it will be necessary to treat the heavily infested areas with virus or cancel the project. However, State and private landowners may proceed on their own.

MONITORING

If conducted, this project will be fully monitored by all related State and Federal agencies.

ZONE OF INFESTATION

Zone of infestation is being established by State Forester, Roger Guernsey, as required by law.

PRIVATE LANDOWNER COOPERATION

It appears that all large and almost all small landowners are highly in favor of the control project. Although not required by Idaho State law, it is suggested that permission to spray be secured from each private landowner.

FOLLOWUP ACTION

It will be necessary to keep all Douglas-fir tussock moth infestations in the Northern Region under close surveillance during 1965 in order to determine what control action may be required in 1966.

DOUGLAS-FIR TUSSOCK MOTH PROJECT
Timetable - Calendar Year 1965

Date Due	No.	Item	Action			Remarks
			Responsibility	Date		
Initiated	Completed					
3-16	1.	Organization meeting in Moscow.	State and U. S. Forest Service Regional Office	2-22	3-16	See memorandum.
3-26	2.	Write cooperative insect agreement for Douglas-fir Tussock Moth Project.				
4-2	3.	Write cooperative letters to: State Fish and Game, State Health, and State Dept. of Agriculture.	State (Scribner)			Obtain proposed monitoring programs and possible cost.
4-2	4.	Check dairy herds and milk cow pastures needing protective measures.	State (Woodland For.)			Obtain waivers.
4-2	5.	Information and Education problem analysis and begin key I&E contacts.	St. Joe NF and State (Hilding and Guernsey)			Coordinate with State Forester.
4-2	6.	Establish zones of infestation.	State (Guernsey)			State Land Board Meeting.
4-10	7.	Airfield selection and approval to use.	State (Scribner)			Pullman-Moscow-Princeton.
4-10	8.	Prepare control area map.	St. Joe Nat'l F. (Miller)			Helicopter use will reduce area.
4-16	9.	Hold public information meetings at Troy, Sanders, Potlatch, Deary, Enida and Moscow.	State and Regional Office			Film "WHIP"; slides on life history of tussock moth and question and answer period.
4-15	10.	Firm up personnel assignments, communications, and vehicles.	State and St. Joe Nat'l For. (Scribner and Miller)			Rough draft of operational plan.
4-15	11.	Spray block delineations and acreages in each block.	Regional Office & St. Joe Nat'l F. (Kucera & Miller)			Obtain final acreage figure.
4-15	12.	Prepare contracts and solicit bids.	Regional Office			
5-1	13.	Complete operational plan.	St. Joe Nat'l For. & Regional Office (Miller)			Coordinate plan with Scribner.

DOUGLAS-FIR TUSsock MoTH PROJECT

Timetable - Calendar Year 1965.....(cont'd)

5-21	14.	Field check of egg masses.	Regional Office (Kucera)			Learn area check facilities.
6-1	15.	Unit entomologist assigned to project.	Regional Office (Kucera)			Start development checks.
6-10	16.	Select and establish development plots, mortality lines and card lines.	Regional Office (Kucera)			Follow written guidelines.
6-14	17.	School for development and card checkers.	Regional Office (Kucera)			Scott to assist as needed. Life history, slides & other media.

STATE OF IDAHO
DEPARTMENT OF FORESTRY
Boise, Idaho

Declaration of Zone of Infestation
Douglas-fir Tussock Moth

WHEREAS, the population of the Douglas-fir tussock moth which kills Douglas-fir and grand fir has increased to epidemic proportions in part of Benewah, Latah, and Shoshone Counties, and

WHEREAS, valuable timber resources are threatened on state, private and Federal lands, and

WHEREAS, control of this infestation is practical and necessary and funds are available for such control,

NOW THEREFORE, I, Roger L. Guernsey, State Forester, by authority vested in me by Section 38-602, Idaho Code, and with approval of the State Board of Land Commissioners on April 21, 1965, do declare a ZONE OF INFESTATION OF DOUGLAS-FIR TUSSOCK MOTH, said zone being described as follows:

All portions of the following listed Townships lying wholly or in part in Benewah, Latah and Shoshone Counties.

Township 46 North, Range 4 West BM
Township 45 North, Ranges 3 and 4 West BM
Township 44 North, Ranges 3 and 4 West BM
Township 43 North, Ranges 3, 4, and 5 West BM
Township 42 North, Ranges 2, 3, 4, and 5 West BM
Township 41 North, Ranges 2, 3, and 4 West BM
Township 41 North, Ranges 1 and 2 East BM
Township 40 North, Ranges 2, 3, 4, and 5 West BM

Done this 30th day of April, 1965, at
Boise, Idaho

/s/
ROGER L. GUERNSEY, STATE FORESTER

ATTEST:

/s/
JACK E. GILLETTE, DEPUTY STATE FORESTER

POTLATCH TUSsock Moth CONTROL PROJECT
PERSONNEL ROSTER

<u>Name</u>	<u>Position</u>	<u>Agency</u>
William Scribner	Project Supervisor	State Forestry Department
Clyde Miller	Asst. Project Supervisor	U. S. Forest Service
Al Hammond	Air Safety Officer	U. S. Forest Service
Bob Mock	Asst. Air Safety Officer	U. S. Forest Service
Charles P. Kern	Field Operations Officer	U. S. Forest Service
Jerry Hamilton	Asst. Field Operations Officer	U. S. Forest Service
Rex Johnson	Information & Education Officer	State Forestry Department
W. Steurwald	Information & Education Officer	U. S. Forest Service
Wendell Barbee	Administrative Assistant	U. S. Forest Service
Donald Harris	Clerk Radio Operator	U. S. Forest Service
Al Turner	Helicopter Supervisor	U. S. Forest Service
Jack Wengert	Operation Manager	U. S. Forest Service
John Minor	Operation Manager	U. S. Forest Service
Steve Anderson	Observer (Helicopter)	U. S. Forest Service
William Allred	Observer (Helicopter)	U. S. Forest Service
Floyd Bethke	Observer (Fixed-Wing)	U. S. Forest Service
Joe Janus	Observer (Fixed-Wing)	U. S. Forest Service
Ed Svancara	Mixer Operator	U. S. Forest Service
George Thatcher	Mixer Operator	U. S. Forest Service
William Hicks	Loader (Helicopter)	U. S. Forest Service
Bob Sanders	Loader (Helicopter)	U. S. Forest Service
Kenneth Lindsey	Truck Driver (Helicopter)	U. S. Forest Service
Bruce Cameron	Truck Driver (Helicopter)	U. S. Forest Service
Randy Bloom	Meter Reader (Fixed-Wing)	Potlatch T.P.A.
Mike Smock	Watchman (Helicopter)	Potlatch T.P.A.
Bob Clifford	Watchman (Helicopter)	Potlatch T.P.A.
William Frost	Bull Cook	U. S. Forest Service
Gordon Nikolaus	Communications Technician	U. S. Forest Service
Joseph Ewing	Repeater Operator	U. S. Forest Service
Dan Kucera	Unit Entomologist	U. S. Forest Service
Pat Pendell	Spray Card Checker	Potlatch Forests, Inc.
Guy Graham	Spray Card Checker	Potlatch Forests, Inc.
Don McManamon	Spray Card Checker	State Forestry Department
Ralph Mathison	Spray Card Checker	State Forestry Department
Douglas Pittman	Spray Card Checker	State Forestry Department
Frank Schoeffler	Spray Card Checker	State Forestry Department
Tom Tutt	Spray Card Checker	U. S. Forest Service
Keith King	Spray Card Checker	U. S. Forest Service
Mike Reeb	Mortality Checker	State Forestry Department
Larry Goodrich	Mortality Checker	Northern Pacific Railroad
George Harlan	Mortality Checker	Potlatch Forests, Inc.
Gordon Thiessen	Weather Checker (Fixed-Wing)	State Forestry Department
Steve Jackey	Weather Checker (Fixed-Wing)	State Forestry Department
Leon Hoffine	Weather Checker (Fixed-Wing)	State Forestry Department
James Rosenthal	Weather Checker (Fixed-Wing)	State Forestry Department
Tom McAndrews	Formulation Checker	U. S. Forest Service

NamePositionAgencyAdvisory Personnel:

H. F. Viche	Regional Air Officer	U. S. Forest Service
Ray Hilding	Forest Supervisor, St. Joe National Forest	U. S. Forest Service
David Scott	Technical Assistant	U. S. Forest Service
W. C. Evans	Contracting Officer	U. S. Forest Service
Charles Haynes	Monitoring Coordinator	Idaho Fish and Game Dept.

Lennington Corporation (Insecticide):

Marvin Lennington	Contractor
Ed Chemaaur	Grounds Supervisor

Aurora Air Inc. (Fixed-Wing Contractor):

John E. Demers	Contractor
Randy Tucker	Chief Pilot
John "Ace" Demers	B-17 Pilot
Leo Demers	B-17 Co-Pilot
Mathew Rees	C-39 Pilot
Jim Winslow	C-39 Co-Pilot
Al Monroe	Cessna 180 Pilot
Vern Murray	Cessna 205 Pilot
Charles Brickman	Mechanic
Dallas Grant	Mechanic
Jim Smith	Mechanic Helper

Helicopter Contractors:Empire Helicopters

Bud Green	Owner-Pilot
Buzz Miller	Pilot
Jim Haun	Mechanic
Clark Wright	Mechanic

Hillcrest Aviation

Ben Merrill	Pilot
Harold Clause	Pilot
P. T. Carlstron	Mechanic

Johnson Flying Service

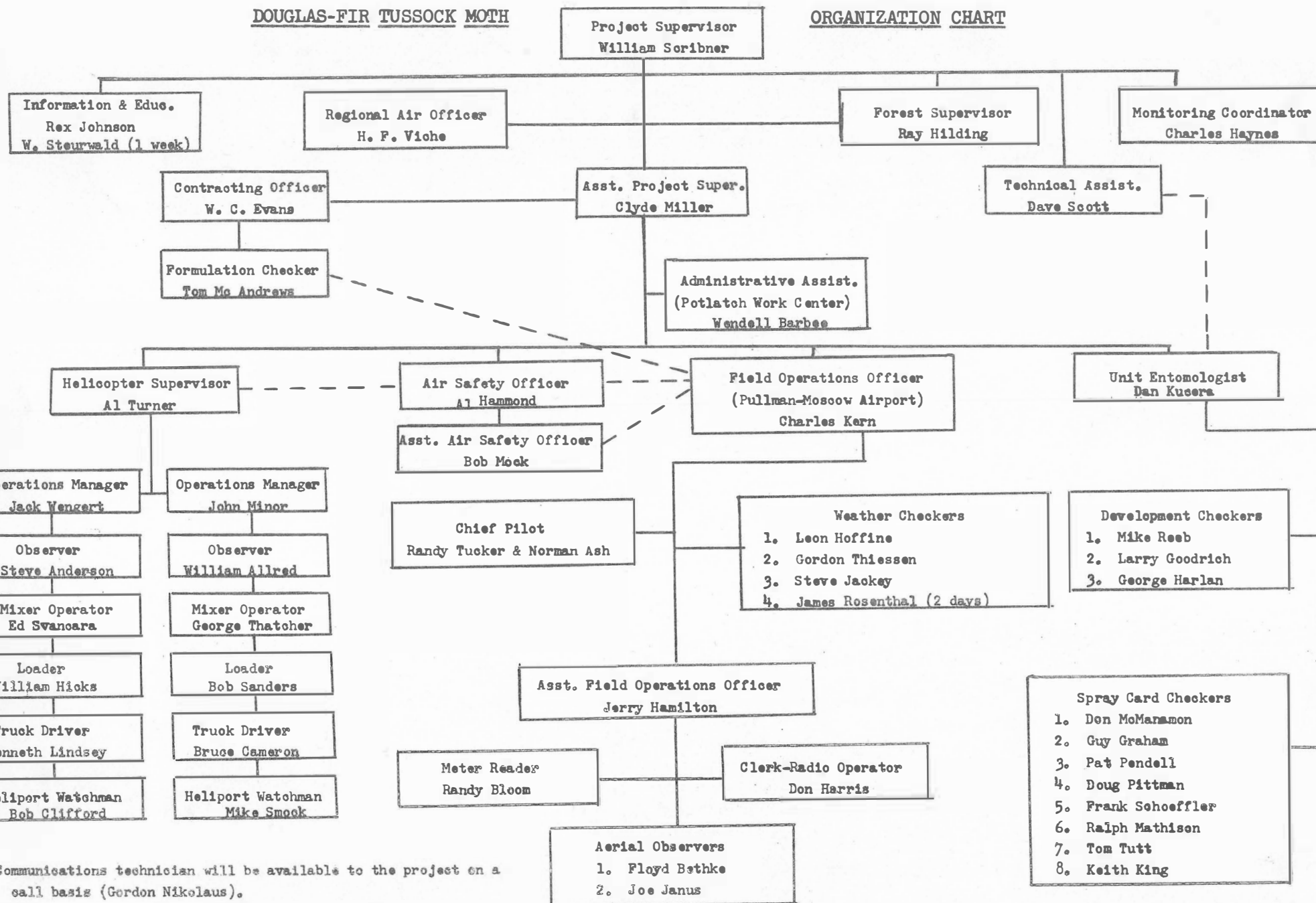
Bill Wiles	Pilot
Swede Nelson	Pilot
Rod Snider	Pilot
Rod Kvamme	Pilot
Gary Marlum	Mechanic

Shasta Helicopter

Darrel Sucher	Pilot
Brent Pullin	Mechanic

DOUGLAS-FIR TUSsock MOTH

ORGANIZATION CHART



Communications technician will be available to the project on a call basis (Gordon Nikolaus).

Repeater Operator - Palouse-Baldy Lookout (Joseph Ewing).

SAMPLE COLLECTION PLAN

Monitoring for DDT Concentrations in Wildlife

1. Collect adipose tissue and gonad samples from five deer prior to the treatment.
2. Collect adipose tissue and gonad samples from ten deer at least one month following the completion of the treatment.
3. Immobilize at least two deer in the vicinity of Troy and two within the Hatter Creek deer enclosure. Adipose tissue samples will be excised from these deer. Collection will be at least one month following the completion of the control project.
4. Collect adipose tissue and gonad samples from five ruffed grouse prior to the treatment.
5. Collect adipose tissue and gonad samples from ten ruffed grouse at least one month after the completion of the treatment.
6. Survey the streams within the treated area to determine the extent of insect kill. If fish kill is found, specimens will be collected for determination of DDT residue levels.

TUSSOCK MOTH PROJECT

I & E PLAN

I. General

Since most of the 130,000 acres (more or less) to be included in the control project area are state and privately-owned, it was agreed that the state should supply the project leader and lead also the Information & Education effort. The total job will be a cooperative venture of the State, U.S.F.S. and private owners, with the U.S.F.S. furnishing part of the funds, the technical direction and services, and letting of contracts. A supervisory force of about 35 will be required, supplied as follows: (Private - 7; State - 12; U.S.F.S. - 20).

The I & E effort will require, but not be limited to: news and radio releases, letters to and personal contacts with key citizens and government officials, and neighborhood public meetings.

II. News Releases (Press and Radio)

A. All releases on major news developments will be issued by or through the State Forester's Office, after coordination with the Regional Office. Copies to be distributed to:

Moscow Daily Idahonian
Lewiston Tribune
St. Maries Gazette
Supervisor, St. Joe
District Forest Ranger
Area Forester
Woodland Foresters
Royce Cox
Regional Office
Coeur d'Alene State Forestry Office
Western Wood Products Association
North Idaho Forestry Association
Clearwater Timber Protective Association
File

B. Radio-concentrate on follow-up and supplemental reports and personal interviews with Ranger and Woodland Foresters.

III. Letters & Personal Contacts (accomplish prior to April 12)

A. State Forester will make contacts with:

Fish & Game
Public Health
University, College of Forestry
Idaho Wildlife Federation
Virgil T. McCroskey, Garfield, Wash.
Parks Department
North Idaho Forestry Association
Western Wood Products Association
Clearwater Timber Protective Association

B. Royce Cox will keep U. S. Congressional Delegation advised.

C. St. Joe Forest Supervisor and St. Joe Area Forester will:

1. Fully coordinate local contacts beyond following:

a. St. Joe Supervisor contact:

State representatives
Local wildlife groups and Fish & Game Department
Local businessmen, including:
forest industry people
University - both College of Forestry & Entomology Department

b. St. Joe Area Forester (Woodland Foresters)

(1) High Priority - start immediately contacting landowners to determine sensitive areas that need to be sprayed by copter or avoided. Check especially dairy operations, apiaries, and other sensitive areas.

(2) State Senators
County Agents
County Commissioners
Key leaders of Christmas tree growers & farmer groups

IV. Local Meetings

A. To be arranged by Woodland Foresters Schoeffler and White in following towns during period April 12-16

Emida-----White
Sanders-----White
Potlatch-----Schoeffler
Deary-----Schoeffler
Troy-----Schoeffler
Moscow-----Schoeffler

B. Technical man to be supplied by U.S.F.S.

C. Show film (Operation WHIP)

D. State Forester to advise Gene Burch of schedule.

V. Miscellaneous

A. Forest Service will do fact sheet (see attached).

STATE OF IDAHO COOPERATIVE BOARD OF FORESTRY

OFFICE OF
The State Forester



STATE CAPITOL BUILDING • BOISE, IDAHO

6 April 1965

ROBERT E. SMYLLIE
GOVERNOR

O. J. BUXTON
LAND COMMISSIONER

ROGER L. GUERNSEY
STATE FORESTER

TO: LANDOWNERS

FROM: Roger L. Guernsey, State Forester

SUBJECT: Tussock Moth Infestation and Control

During 1964, a tussock moth infestation in Latah and Benewah Counties exploded into epidemic proportions, covering some 300,000 acres. Because of imminent damage and loss of the timber stands involved, a control project has been approved for 1965 on approximately 150,000 acres.

The plan is to aerial spray 7,500 acres with a tussock moth virus and the balance of the area with 3/4 pound of DDT per acre. Extreme care will be exercised in the DDT area to avoid dairies, apiaries and similar sensitive areas.

In order that the landowners can be fully informed on the control plans, a series of neighborhood meetings is being held. We are inviting you to attend if you are interested in the program. The meeting schedule is listed below so that you may choose the most convenient location for you:

April 12, 1965	8:00 pm	Moscow, Idaho
	Community Room, Latah County Grain Growers	
April 13, 1965	8:00 pm	Deary, Idaho
	Meeting Room, Deary Booster Hall	
April 14, 1965	8:00 pm	Princeton, Idaho
	Meeting Hall, Princeton Grange	
April 15, 1965	8:00 pm	Tensed, Idaho
	Tensed Grange Hall	
April 16, 1965	8:00 pm	Troy, Idaho
	Fire Hall Meeting Room	

/s/
ROGER L. GUERNSEY
State Forester

RLG/WAS:jar